

THE MURPHY CHEMICAL COMPANY LIMITED,
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HERTS.

ADVISORY BULLETIN No. 8

ON

The Control of Capsid Bugs
BY
Winter Washing.

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COVER WE SUPPLY

Recommendations for the Control of Capsid Bugs on Apples and Black Currants by Winter Washes.

LIFE HISTORY.

There are, as a rule, only two species of Capsid causing injury to apples and black currants. These are, the Apple Capsid *Plesiocoris rugicollis*. Fall, and the Currant Capsid *Lygus pabulinus*, L. The Apple Capsid is also commonly found on currants and the Currant Capsid is sometimes found on apples as well as on currants and many other trees and shrubs. The eggs of both species are laid under the bark of the host plants, with only a tiny portion exposed; this is the "cap" through which the egg breathes. When this "cap" is sealed over by a film of oil deposited by the winter wash then the egg is deprived of oxygen and after a while it dies. The eggs are found chiefly in the young shoots, but on apples, they have also been known to occur in the trunk and main branches. The winter is passed in this stage and in the spring the eggs hatch and give rise to small greenish bugs which very much resemble Aphides (Greenfly). They are, however, more active than the latter. These young bugs feed on the sap and where they puncture the leaf, a reddish-brown spot appears. By their feeding they cause the terminal shoots to stop growth or die back and this encourages the formation of numerous side shoots, which produce a badly shaped or stunted tree or bush carrying excess wood and few fruit buds. In the case of *Plesiocoris*, on apples, the young bugs feed on the fruit, causing the apples to develop abnormally. Where the bugs puncture the fruit, cracks, scars or pimples appear as the apples

grow, and characteristic, irregular, cork like patches are formed. Many apples fail to develop or fall off and those left, in the case of a bad attack, are almost of no market value. The bugs develop wings and become adult about June, in some years, as in 1934, they continue to feed to quite an extent on the well developed fruit causing the formation of numerous little brown spots and slightly raised areas, commonly called "late markings." During this period they deposit their eggs, which then lie dormant until they hatch next spring. Sometimes these winged bugs migrate from one tree to another but as far as is known they do not fly any great distances. By the end of July they are generally all dead.

On black currants *Plesiocoris* does not as a rule cause much, if any, damage to the fruit. Eggs are laid during June and July and by the end of July almost all the bugs are dead.

In the case of *Lygus*, after hatching from the eggs and feeding for some time on the shoots, the majority of the young bugs leave their winter hosts and migrate to herbaceous plants such as strawberry, potato, thistle, bindweed, etc. Here they grow, become adult and lay their summer eggs during June and July. These eggs hatch, the young bugs become winged and fly back to their winter host plants to lay their eggs. This return migration generally occurs in late August to September; sometimes the bugs will fly onto apple and feed on the fruits producing "late markings" very similar to those produced by the adults of *Plesiocoris*.

If Capsid is present on apples where currants are grown as undercrops then it is advisable to spray the currants as well as the apples. Otherwise, if the currants are left unsprayed, the bugs may fly from the currants onto the apples in the summer (especially in the case of *Lygus*) causing the grower to think that the wash used has failed to control the Capsid on the top trees.

In this connection it is important that black currants, infected with *Lygus*, as undercrops, should not be grubbed up in summer or else the adult *Lygus* returning in autumn

to lay its winter eggs will probably then attack apple or pear trees, damaging the fruit and laying its eggs there. If the black currants are left until November, they will serve as a trap crop; the *Lygus* will lay its eggs there and the bushes can then be grubbed up and burnt.

RECOMMENDATIONS FOR CONTROL.

(a) ON APPLES.

(1) Where possible, apply two separate winter washes, as this is the most efficient and reliable method. Spray first in January to February with a reliable tar-distillate wash at 5 to 10% concentration and follow by a high grade petroleum oil wash at $7\frac{1}{2}\%$ concentration *during the last three weeks in March*. If this petroleum oil wash has to be applied during February, it is advisable to use a 10% concentration. This double spraying method is particularly applicable to a mixed orchard of apples and plums; the whole orchard can receive the tar distillate to control Aphis, Apple Sucker and Winter Moths and the petroleum oil can be applied to the apples only to control Capsid. It is also applicable to orchards where undercropping is practised, as a good petroleum-oil wash does not as a rule, cause much, if any, damage to normal undercrops.

(2) Where time or other factors do not permit of the application of more than one winter wash, apply either : (a) a carefully blended, mixed tar-petroleum wash at 10% concentration *as late as possible up to the end of February*. This will control Aphis, Apple Sucker, Winter Moths, Red Spider and Capsid, but must be used with care where there is undercropping or in mixed orchards, as in some cases injury to gooseberries, red currants or strawberries or to plums interplanted with the apples, has been known to occur, especially where the mixed wash has been applied rather late. Or, (b) a high grade petroleum-oil wash alone at 10% concentration, as late as possible up to the middle of March. (This wash alone, without the previous application of a tar-distillate wash, will control Capsid, but will give only a partial control of Aphis, Apple Sucker (*Psylla*) and Winter Moths and is,

therefore, only to be recommended in cases where the eggs of these pests are not present on the trees in any numbers).

(b) ON BLACK CURRANTS.

(1) Where possible, apply two separate winter washes, as this is the most efficient and reliable method. Spray first in January to February with a reliable tar-distillate wash at 5 to 10% concentration to control Aphis and Caterpillar and follow by a high grade petroleum-oil wash at $7\frac{1}{2}\%$ *during the last three weeks in March, or until the first leaves are the size of a sixpence*, to control Capsid.

(2) Where time or other factors do not permit the application of more than one winter wash, apply either: (a) a carefully blended, mixed tar-petroleum wash at 10% concentration *as late as possible up to the end of February*. This will control Aphis and Caterpillar as well as Capsid; or (b) a high grade petroleum oil wash alone, at $7\frac{1}{2}\%$ concentration *as late as possible up to the end of March or until the leaves are the size of a sixpence*. (This wash alone, without the previous application of a tar-distillate wash will control Capsid but is only to be recommended where Aphis or Winter Moth eggs are not present on the bushes in any numbers).

After the application of a petroleum-oil wash a minimum period of fourteen days should be allowed to elapse before sulphur, either as a dust or wet spray is applied to the trees. Some authorities recommend an interval of at least three weeks. Therefore, on some varieties of apples where a Lime Sulphur wash is applied at green bud stage for Scab control, the petroleum-oil wash may have to be applied in early to mid March in order to allow this 14-21 days period to elapse before applying a sulphur spray or dust. Similarly, on black currants, where Lime Sulphur is applied to control Big Bud, the petroleum-oil wash may have to be applied a little earlier than recommended above. Or, the petroleum-oil wash applied at $7\frac{1}{2}\%$ when the leaves are the size of a sixpence may be used to control Big Bud as well as Capsid, and the Lime Sulphur omitted.

CHOICE OF WASH.

A good petroleum-oil wash should contain a high percentage of high boiling oils; inferior washes, containing low boiling oils, will not give the permanence of oil film necessary to maintain a film of oil over the 'cap' of the egg, which is essential for efficient Capsid control, and are liable to cause damage to the trees.

A good mixed tar-petroleum wash should contain carefully blended proportions of tar-distillate and petroleum oils, of suitable boiling range. If either or both are unsuitable in this respect, egg killing properties will be lowered and the possibility of damage to the trees will be considerable. There are two types of both petroleum and the mixed tar-petroleum washes. The most common is the emulsion type, where the concentrate is cream-like in colour and consistency. The other, is the miscible or soluble type, where, the concentrate is a dark easy flowing liquid very similar in appearance to a tar-distillate wash. Up to the present time there has been no evidence to show which of these two types of washes is the most efficient.

APPLICATION.

Even the *very best* washes, applied at the correct strengths and the correct time, will not give a good control of Capsid if the method of application is not efficient. Success in Capsid control can only be obtained by ensuring that every inch of the tree, from the trunk and main branches to the extreme tips of the highest shoots, is covered by a film of oil. In order to obtain this efficient distribution of the oil film, the following points should be noted :—

1. MIXING.

In the case of emulsion type washes an equal quantity of water should be added to the amount of concentrate required and the whole stirred until an even cream results. The balance of the water should then be gradually added, with continual stirring, and the wash applied without delay. This applies also to the miscible type, but the same care employed in mixing up a preliminary cream is not absolutely essential.

A *little* oil separation on the surface of the diluted wash is common and harmless, but if considerable separation takes place the reason should be sought.

10%	=	{	4	gallons concentrate to	36	gallons water.
			10	"	"	"
			"	"	"	"
			"	"	90	"
			"	"	"	"
7½%	=	{	3	"	"	37
			7½	"	"	92½
			"	"	"	"
			"	"	"	"
			"	"	"	"
5%	=	{	2	"	"	38
			5	"	"	95
			"	"	"	"
			"	"	"	"
			"	"	"	"

When using an emulsion type petroleum oil wash it is well worth while adding one pint of tar-distillate concentrate to every forty gallons of diluted wash as an aid to seeing the spray on the tree.

2. WEATHER.

Spraying should not be carried out in wet weather, or when the trees are damp, since moisture on the tree prevents the formation of an efficient oil film. The concentrate should be protected from frost, and spraying in frosty weather avoided, if possible. Weather conditions should be chosen to allow of at least six hours dry weather after spraying, as it is essential that the wash should dry off before rain occurs. If it is necessary to spray when the trees are damp or light rain is falling then the concentration of the wash should be increased by about 2½%. Spraying during windy weather should be avoided, as a high wind makes it impossible for the trees to be covered efficiently.

3. HIGH PRESSURE AND SUITABLE EQUIPMENT.

For apples, aim at 350-400 lb. per sq. in.; regard 200 lb. as an absolute minimum. For currants, efficient control can be obtained by pressures of 150-200 lb. per sq. in., but if a higher pressure is obtainable, use it wherever possible.

Frequently, the pump will give the required pressure, but the hose and connections are unsuitable. Good hose and suitable connections, designed to withstand these high pressures, are essential for efficient Capsid control.

The wash should be applied as a coarse driving spray and *not* as a fine mist. The size of disc, the number and type of nozzles, and the type of lance or gun employed should be such that the trees can be drenched quickly and efficiently and that the tips of the highest shoots can be properly sprayed.

4. SPRAYING PERSONNEL.

Capsid spraying, much more so than ordinary Winter washing, is an operation in which special attention should be paid to the spraying gang. It is better to employ six men and take a little longer, than to employ eight men, two of whom are not spraying properly. It is generally well worth while explaining to the men how Capsid spraying differs from ordinary winter washing, and impressing upon them the necessity of thoroughly coating every inch of the tree with spray, applied as much as possible against the wind.

5. AMOUNT OF WASH USED.

If a petroleum oil wash is applied after a tar-distillate wash, the amount of petroleum wash used should be as much as, or even more than, the amount of tar-distillate wash previously applied to the same trees. In the Wisbech district however, it is maintained by some authorities that the amount of petroleum oil wash applied need be only two-thirds the amount of tar wash previously applied, because the majority of the trees have been pruned down so that the tips of the branches can easily be reached. In the case of a mixed tar-petroleum wash or a petroleum oil wash used alone and not after a tar-distillate wash, the amount applied should be about one-and-a-quarter times the amount of tar-distillate wash necessary to spray the trees as an ordinary winter wash.

6. METHOD OF SPRAYING AND POSITION OF OPERATOR.

The operator should *not* stand facing the tree, with his back to the wind and allow the wash to drift through the tree. He should commence by facing the wind, just to one side of the path of the drift. He should push his

lance or gun in, towards the centre of the tree, and spray first the branches furthest away, always commencing at the tips of the highest shoots and working downwards towards the trunk keeping the nozzle as near the part to be sprayed as possible. It is important to spray the *whole of the tree*, including the main branches and trunk, since there is evidence that Capsid eggs may be laid in these, as well as in the young shoots. The operator should gradually move backwards around the tree, keeping just to one side of the spray drift, holding the lance for one part of the tree with the left hand in front of the right and then facing round for the other part of the tree, with the right hand in front. By this means, about three-quarters of the tree can be sprayed directly *against* the wind. The remaining quarter of the tree can then be sprayed with the wind, the operator standing facing the tree with his back to the wind. Again, the operator should spray first those branches furthest away, keeping the nozzle as near the part to be sprayed as possible to ensure that the branches are covered by spray applied at the full pressure of the pump and not merely blown there by the wind. The pressure of even a strong wind is very small as compared with the pressure given by a good pump (a strong wind only gives a pressure of about 1 lb. per sq. in.) ; it is not sound policy therefore to obtain a pressure of 400 lb. per sq. in. on the pump and then allow much of the wash to hit the branches or twigs at a pressure equal only to that of the prevailing wind. A high pressure is necessary to force the wash through the hairs on the twigs and into crevices in the bark ; without this pressure proper wetting cannot be obtained. The oil film produced by the wash blown on to the tree by the low pressure of the wind is, therefore, much less effective than that produced when the wash is forced on to the tree by the full pressure of the pump.

December, 1934.

We supply the following Winter Washes, made from the most suitable oils :—

Mortegg TAR-DISTILLATE WASH.
For General Winter Spraying.

Mortoyle PETROLEUM OIL WASH.
*For Capsid and Red Spider Control
(Emulsion and miscible types).

Capsomort TAR-PETROLEUM WASH.
For Capsid Control
(Emulsion and miscible types).

Mortolem TAR-PETROLEUM WASH.
For Red Spider Control.

To date the following Advisory Bulletins have been issued :

1. The Apple Blossom Weevil.
2. The Spring Control of Apple Capsid Bugs.
3. The Apple Sawfly.
4. The Raspberry and Loganberry Beetle.
5. The Plum Sawfly.
6. The Control of Scab on Apples and Pears after Blossoming.
7. Winter Washing.
8. The Control of Capsid Bugs by Winter Washing.
9. The Control of Red Spiders on Fruit Trees and Bushes,
Strawberries, Hops and Violets.

